

Abstract Submitted  
for the DFD06 Meeting of  
The American Physical Society

**Time-Resolved PIV and Pressure Measurements of Oscillating and Pulsating Flow in a Rapid Expansion**<sup>1</sup> BARTON SMITH, CAMERON KING, Utah State University — Separating oscillating flow in an internal expansion with a total angle of 30 degrees is studied experimentally. Time-Resolved PIV measurements and simultaneous pressure measurements reveal that during the accelerating portion of the cycle, the flow may remain attached in spite of a very large adverse pressure gradient. During the decelerating portion of the cycle, the flow is more prone to separation. The duration and extent of the separation depends on Reynolds number (based on stokes layer thickness) and more critically, the oscillation displacement amplitude relative to the cross-stream dimension. The time-varying pressure measurements are used to determine the resultant minor losses for the flow in each direction as well as the acoustic impedance. These are found to be a decreasing function of the Reynolds number and an increasing function of displacement amplitude. The impact of the addition of a steady-flow component in the direction of increasing flow area is also assessed.

<sup>1</sup>The support of the NSF under grant CTS-0521621 is gratefully acknowledged.

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Date submitted: 04 Aug 2006

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